

## STRUCTURED CABLING SYSTEM AND PATCHING METHOD

This invention relates to a structured cabling system and to a method of patching a structured cabling system.

Structured cabling systems enjoy extremely wide use for the purposes of providing data and voice services cabling within a commercial environment. Typically, a structured cabling installation comprises a plurality of rack mounted patch panels. Some of these patch panels will have cables connected to the individual jacks thereof leading to remote jacks at various locations around a building. Others of the patch panel will be connected to other fixed installations, for example a telephone switch system. Once all the fixed cabling has been installed patch leads are used to connect the jacks of respective patch panels to establish connections therebetween.

Heretofore, the patching process has been slow and even if carried out with care by skilled staff has been prone to error. In a large installation with many patch panels it can be difficult to see exactly which jack needs to be connected to which other jack. Further, the patching information (that is the instructions as to which jack is to be connected to which other jack) have to be read by the operator either from a hard copy print or a computer as he makes each connection. This is time consuming and prone to error.

We have now devised a new structured cabling arrangement and associated patching method which substantially eliminates the possibility of error and greatly speeds up the patching process. The method of the present invention is applicable both to patching of new installations and to the re-patching of existing installations, for example as a result of relocation of different departments within an office building.

In accordance with the first aspect of the present invention there is provided a structured cabling system comprising a plurality of patch panels each having a plurality of jacks; an indicator device associated with each jack, each indicator device being operable by an applied electrical signal to provide a visual indication of its

associated jack; and sensor means associated with each jack to provide an electrical indication of the presence or absence of a plug connected to the jack.

The present invention further provides a method of providing connection between a plurality of jacks provided on at least two patch panels, comprising the steps of providing a plurality indicator means, each said indicator means being associated with a single jack of one of said patch panels so as to identify said associated jack, and actuating each indicator means in a sequence which identifies pairs of jacks into which the two ends of a patch lead are to be connected in order to effect a connection between said first and second jacks.

The present invention still further provides a jack for a structured cabling system according to any of claims 1 to 12, comprising a body having a plurality of contacts therein and two partial shielding cans which are electrically isolated from each other, said cans, in use, being engaged by at least one contact formed on a plug which mates with said body in order to effect an electrical connection between said cans.

In use of the present system, details of the required patching are set up on a central processing unit, for example a laptop computer or a server, and the central processing unit guides the installer in his patching activities. Typically, when the system is initiated to commence patching it will identify the first jack to which a patch lead is to be connected and will activate the indicator associated with that jack to provide a visual indication of the jack in question. The indicator can conveniently be a light source, for example a light emitting diode. Upon seeing the light the operator will insert the plug at one end of the patch lead into the identified socket. The insertion of the plug will be identified by the central processing unit which will then deactivate the indicator associated with the first jack socket and activate an indicator associated with the jack to which the other end of the first patch lead is to be connected. Insertion of the jack at the other end of the patch lead will be detected by the central processing unit. Alternatively, the indicators associated with the two jacks can be activated simultaneously and then simultaneously deactivated once a plug is

detected in each or each separated deactivated when a plug is detected therein.

In a particularly preferred embodiment of the invention, the patch lead will include a continuity conductor so that correct patching can be validated by establishing a current path from the first jack to the second jack via the patch lead. This validation can conveniently be carried out by the central processing unit. Once the first patch has been completed in this manner the central processing unit will illuminate another jack and the operator will plug the first end of a second patch lead into the indicated jack. The process is repeated until the patching is complete.

It will be appreciated that the above described system means that patching can be carried out rapidly and by unskilled staff. The possibility for wrong patching is, in effect, eliminated because the system will not move on to the next patching operation until the last patching operation has been satisfactorily completed and validated.

In a particularly preferred embodiment of the invention the means for indicating the presence or absence of a jack comprises the establishment, by a contact on the plug, of a connection between two contacts provided associated with the jack. The contacts may, for example, be in the form of a split can which surrounds the jack. The two parts of the can are connected to an appropriate detector circuit so that when the two parts of the can are electrically connected by the plug an electrical signal indicating the presence of the jack is provided.

In a particularly preferred embodiment of the invention means are provided for creating a record of the insertion and/or removal of a plug from a jack. The record may, for example, be established on the computer which carries the patching data. Typically, when a plug is inserted into an indicated jack, the fact of correct insertion will be noted on a database. Similarly, when the other end of a patch cord is inserted into an indicated jack, a record of this insertion will be created. If a continuity check is provided within the system, the results of the continuity check will likewise be recorded on the database. Preferably, means are provided for validating the records maintained by the database relative to the original patching instructions to provide confirmation that the patching has been correctly carried out.

The system preferably may also be used to facilitate re-patching. In this mode, if a modified patching arrangement is to be established a first jack will be indicated to show which plug should be removed. A second jack can then be indicated to show the new location of that plug. Preferably, a database record and validation system for the re-patching will be established.

The invention will be better understood from the following description of a preferred embodiment thereof, given by way of example only, reference being had to the accompanying drawing which schematically illustrates a single jack of a structured cabling system.

The drawing illustrates schematically a single jack of a structured cabling system. It will be appreciated that, in practice, many identical jacks will be present in such a system. For simplicity, all jacks of the system should preferably be in the form of the single jack illustrated in the drawing.

The jack comprises a conventional body 1 and contacts 2 in accordance with the RJ45 protocol. Adjacent the jack is provided an LED 3 which can be illuminated in response to a signal 4 provided by a central processing unit. The LED 3 is immediately adjacent the jack 1 so that when the LED is illuminated it identifies uniquely the jack to which it is adjacent.

The jack 1 is provided with two partial shielding cans 5, 6 which, when no plug is present in the jack, are electrically isolated from each other. The two separate parts 5, 6 are connected by suitable cabling 7, 8 to a central processing unit.

Patching of an installation comprising a multiplicity of the jacks shown in the drawing is accomplished as outlined above.